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October 16, 2008

IN THE UNITED STATES PATENT & TRADEMARK OFFICE

Applicant: Gary Lynn Hanley

Examiner: Essama Omgba

Serial #: 10/736,019

Art Unit: 3726

Filing Date: 12/15/2003

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Title: Process for Removing Thermal Barrier Coatings

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Pre-Appeal Brief Request for Review

This communication is being simultaneously filed with the Notice of Appeal in the above-referenced application.

35 U.S.C. §103

The examiner has rejected claims 1-7 and 28-30 under this section, paragraph (a) as being unpatentable over Esser et al. (US 2003/0148710) (hereinafter "Esser") in view of Sangeeta et al. (US Patent 5,976,265) (hereinafter "Sangeeta"). The examiner asserts that Esser discloses a process of removing aluminide-containing material or a thermal barrier coating from a metallic substrate using a blasting process as non-abrasive process. The examiner acknowledges that Esser does not specifically disclose the non-abrasive blasting process being one that uses an air jet. The examiner asserts, however, that Sangeeta discloses a process for removing an aluminide-containing material from a metallic substrate surface, by directing an air jet at the aluminide-containing material on the substrate surface of the component, the jet comprising non-abrasive particulate media such as glass beads, the average particle size being less than 500 microns, the air jet being directed at the aluminide-containing material at a pressure less than about 40 psi

sufficient to remove the aluminide-containing material but insufficient to damage the substrate surface.

The examiner has further rejected claims 8-27 and 32-36 under this section, paragraph (a) as being unpatentable over Applicant's Admitted Prior Art (AAPA) in view of Esser and Sangeeta. The examiner asserts that the AAPA discloses known methods of removing thermal barrier coatings from turbine blades as well as from laser drilled cooling holes in turbine hot section components. The examiner further asserts that it would have been obvious to one of ordinary skill in the art to have used a nonabrasive blasting process (as taught in Esser) to remove thermal barrier coatings in the method of the AAPA to remove the thermal barrier coating without damaging the underlying substrate, especially when combined with the teachings of using an air jet, as taught in Sangeeta.

The claims as currently amended are not anticipated by nor obvious in light of Esser or Sangeeta. Neither Esser nor Sangeeta teach of a method of using an nonabrasive media within an air jet to remove a thermal barrier coating that has **not been purposefully degraded** before the removal. The inventions of Esser and Sangeeta require the degradation of the coating being removed before the abrasive or nonabrasive particles are used to remove the coating. The present invention offers an option allowing for the removal of a thermal barrier coating without degrading the coating, an option that was not previously available, even considering the inventions of Esser and Sangeeta.

As was previously pointed out by the applicant, Sangeeta teaches of a method of removing an aluminide-containing material from a metal substrate, and does not teach of a process for removing a thermal barrier coating. Sangeeta teaches of using abrasive particles, as opposed to the current invention's nonabrasive media. And lastly, Sangeeta requires that a chemical or stripping solution be used to degrade the aluminide coating for removal.

Esser teaches of a method of removing a thermal barrier coating, however, as the examiner pointed out, does not teach of using an air blast of nonabrasive particles. Esser, more importantly, requires the thermal barrier coating be cooled to below room temperature, leading to embrittlement, thus degrading the coating before removing it with a nonabrasive media process (Paragraphs 0015-0018, 0033-0034, 0038, and many other locations throughout the Esser publication). In fact, the degrading of the coating is a pivotal point of the Esser invention: "In particular it is an object of the invention to provide a method of removing a **degraded** metallic layer effectively, thereby leaving the underlying substrate or other layers unaffected." [Par 0015 of Esser] (emphasis added). The present invention removes the step of degrading the coating before removal, and the claims have been amended to reflect this.

The applicant's attorney would respectfully request that the Examiner revisit the rejections in view of the following arguments as associated with the amended pending claims. Sangeeta teaches of a process that requires a substrate with a coating to be contacted by a stripping composition prior to the blasting of any abrasive particulate. Sangeeta requires the use of a stripping composition and in some cases additional treatment steps such as rinsing steps to loosen the thermal barrier coating, compromising the coating and allowing the coating to be removed by a blasting of particulate. Esser teaches of a process that requires the metallic layer be cooled to below room temperature, leading to embrittlement prior to the blasting to remove the coating. Neither Esser nor Sangeeta provide teaching of any process by which a thermal barrier coating can be removed solely by the blasting of non-abrasive particles, as is taught by the present application.

It is well settled that the omission of an element and its function within an already known invention is only an obvious expedient if the remaining elements perform the same function as before. See *Application of Karlson*, 311 F.2d 581 (CCPA 1963). In the present matter, the present invention eliminates the necessary element of both Esser and Sangeeta of degrading the coating prior to the removal of the coating (the *Sangeeta* element of requiring the use of a chemical stripping composition to loosen the coating and the Esser element of requiring the use of cooling the metallic layer). The present invention not only eliminates that element and function of Esser and Sangeeta, but also changes the function of the invention, in order to achieve its stated purpose. The improved function of the present invention, that was not foreseen by the Esser or Sangeeta references, allows the removal of the coating from the metal substrate without purposeful degradation of the coating by any means, including the use of a chemical stripping agent or cooling of the metallic layer. The elimination of the necessary element and function of the degradation element of Esser and Sangeeta, while performing a different function shows the present invention in the application at hand is not an obvious variation of the Esser or Sangeeta references.

The present invention allows for the removal of the thermal barrier coating without the degradation of the coating (by use of a chemical stripping agent or cooling). This is not so with the Sangeeta or Esser references. This elimination of elements and different outcome to serve the same purpose is illustrated in the chart shown below:

<i>Esser Reference</i>	<i>Sangeeta Reference</i>	<i>Present invention</i>
Coating is cooled to below room temperature.	Substrate with coating is contacted by stripping composition.	ELIMINATED
Coating is degraded for ease of removal.	Coating is degraded for ease of removal.	ELIMINATED

<i>Esser Reference</i>	<i>Sangeeta Reference</i>	<i>Present invention</i>
The degraded coating is then removed by use of various abrasive or non-abrasive particles.	The degraded coating is then removed by use of various abrasive particles.	The intact thermal barrier coating is removed by use of an air-blasted non-abrasive particles.

Furthermore, even with the additional steps of contacting the coating on the substrate with a stripping composition or cooling the coating, neither the Esser nor the Sangeeta process would produce the same results as the process of the present invention as claimed in the current claim 8 and 18, and the related dependant claims thereto. Esser and Sangeeta provide no method for removing a thermal barrier coating solely from a hole or other portion of a substrate without affecting the coating on the remainder of the substrate. When using the cooling required by the teachings of Esser, or when using the stripping composition required by the teachings of Sangeeta, the coating over the entire substrate, including the coating in the holes as well as the coating over other portions of the substrate (coating that it is desired to maintain, and is not being removed), is degraded and compromised. This makes it impossible to use the teachings of Esser or Sangeeta in the removal of a thermal barrier coating solely from a hole of the substrate.

Notwithstanding the foregoing, independent claims 1, 8 and 18 have been amended to clarify the foregoing and Applicant's attorney believes the amended claims clearly define over the prior art and that all claims are in position for allowance.

Interview Summary

Applicant also requests that the Applicant's Interview Summary, of the interview conducted on Friday, October 10, 2008, be considered to be within the scope of this Pre-Appeal Brief Request for Review. Applicant is submitting the Interview Summary on Thursday, October 16, 2008.

Request for Reconsideration

Applicant believes that all independent claims clearly define over the prior art and that the distinctions between the present invention and the prior art would not have been obvious to one of ordinary skill in the art. Additionally, the remaining dependent claims, by the limitations contained in the base independent claims, are felt to be patentable over the prior art by virtue of their dependency from independent claims which distinguish over the prior art of record. All pending claims are thought to be allowable and reconsideration by the Examiner is respectfully requested.

It is respectfully submitted that no new additional searching will be required by the examiner. A fee determination sheet is attached for this amendment response. The Commissioner is hereby authorized to charge any additional fee required to effect the filing of this document to Account No. 50-0983.

It is respectfully submitted that all references identified by the examiner have been distinguished in a non-obvious way. If the examiner believes that a telephonic conversation would facilitate a resolution of any and/or all of the outstanding issues pending in this application, then such a call is cordially invited at the convenience of the examiner.

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Respectfully Submitted,
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